# ELECTRONIC CARD CONNECTOR

## CROSS-REFERENCE TO RELATED APPLICATION

This application is a Continuation-in-part of U.S. Patent Application, entitled " Electronic Card Connector ", filed on June 4, 2003.

## BACKGROUND OF THE INVENTION

## FIELD OF THE INVENTION

The present invention is related to an electronic card connector including a plastic main body having two lateral arms. Two grounding members are inserted with two sides of the main body. Each grounding member has a U-shaped section for embracing the lateral arm of the main body so as to reinforce the lateral arm.

## DESCRIPTION OF THE PRIOR ART

Fig. 1 shows a connector applied to an electronic card. The connector includes a plastic main body 91. Multiple terminals 911 are side by side inlaid in the base section of the main body 91 for electrically connecting with an inserted electronic card. Two lateral arms 912 respectively extend from two sides of the main body 91. The connector further includes two fixing resilient plates 92. Each fixing resilient plate 92 has an insertion plate 921 inserted in the main body 91. A sidewall 923 radially projects from the fixing resilient plate 92. The sidewall 923 attaches to outer side of the lateral arm 912 of the main body 91 for reinforcing the lateral arm 912. In use, when taking

out the electronic card, the lateral arms 912 are outward stretched. At this time, the fixing resilient plates 92 serve to prevent the lateral arms 912 from breaking. In addition, a connecting plate 922 downward projects from the fixing resilient plate 92 for adhering to the surface of a circuit board.

The above connector structure has some shortcomings as follows:

1. The lateral arm 912 of the plastic main body 91 is a quite elongated cantilever made of plastic material and having weak structural strength. Therefore, when inserting the insertion plate 921 of the fixing resilient plate 92 into the insertion hole 913 of the lateral arm 912, the lateral arm 912 is subject to breakage.

2. In use, when taking out the electronic card, it is necessary to outward stretch the lateral arms 912 which have weak structural strength. As a result, the lateral arms 912 are likely to break due to improper application force. This will end the using life of the connector.

3. The fixing resilient plate 92 lacks any grounding structure for contacting with the inserted electronic card to form a grounding circuit. Therefore, the quality of output signal of the electronic card will be affected.

4. When inserting the insertion plate 921 of the fixing resilient plate 92 into the insertion hole 913 of the plastic main body 91, the insertion plate 921 tends to be biased. This will deflect the connecting plate 922 to exceed the specification. As a result, the connecting plate 922 can hardly correctly contact

with the circuit board ( not shown ) positioned thereunder. Therefore, in the case that the fixing resilient plate 92 is inserted in the main body 91 in a biased state and then adhered to the circuit board, a defective product with poor contact is produced.

## SUMMARY OF THE INVENTION

It is therefore a primary object of the present invention to provide an electronic card connector including: a plastic main body having a base section, multiple terminals being inlaid in the base section for electrically connecting with an inserted electronic card, two lateral arms respectively extending from two sides of the base section; and two grounding members respectively inserted with two sides of the base section for connecting with a grounding circuit of a circuit board. Each grounding member has a U-shaped section integrally connected with a board body of the grounding member for embracing the lateral arm of the main body so as to reinforce the lateral arm.

It is a further object of the present invention to provide an electronic card connector including: a plastic main body having a base section, multiple terminals being inlaid in the base section for electrically connecting with an inserted electronic card, two lateral arms respectively extending from two sides of the base section; and two grounding members respectively inserted with two sides of the base section for connecting with a grounding circuit of a circuit board, each grounding member having a U-shaped section integrally connected with a board body of the grounding member for embracing the lateral arm of the main

body so as to reinforce the lateral arm, the U-shaped section embracing the front section of the lateral arm, a resilient arm integrally extending from a first side of the U-shaped section, a hook arm integrally extending from a second side of the U-shaped section, the resilient arm and the hook arm together embracing two sides of the rear section of the lateral arm.

It is still a further object of the present invention to provide the above electronic card connector in which the grounding member is made of a metal board material by integral punching. The grounding member further has: a board body, an insertion section forward extending from front edge of the board body, ratchets projecting from lateral sides of the insertion section for tightly fitting in an insertion dent of the plastic main body; a grounding conductive plate downward windingly extending from one side of the board body for soldering with a grounding circuit of a circuit board; a grounding resilient plate rearward, upward and obliquely projecting from an edge of the board body, the grounding resilient plate having a free end; hook arm integrally rearward extending from the U-shaped section, a rear section of the hook arm being formed with a hook section for hooking a hook dent of rear end of the lateral arm; and a locating portion including a first locating section downward windingly extending from one side of the hook arm and a second locating section downward windingly extending from one side of the hook arm.

It is still a further object of the present invention to provide the above electronic card connector in which the grounding member is made of a metal board material by integral punching.

The grounding member further has: a board body, an insertion section forward extending from front edge of the board body, ratchets projecting from lateral sides of the insertion section for tightly fitting in an insertion dent of the plastic main body; a grounding conductive plate downward windingly extending from one side of the board body for soldering with a grounding circuit of a circuit board; a grounding resilient plate rearward, upward and obliquely projecting from an edge of the board body, the grounding resilient plate having a free end; a resilient arm integrally extending from a first side of the U-shaped section and having a free end; a hook arm integrally extending from a second side of the U-shaped section, a rear section of the hook arm being formed with a hook section for hooking a hook dent of rear end of the lateral arm; and a locating portion which is an integral plate body downward bent and extending from top edge of the hook arm, a first side of the locating portion being formed with a first locating section, while a second side of the locating portion being formed with a second locating section.

The present invention can be best understood through the following description and accompanying drawings wherein:

## BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 is a perspective partially exploded view of a conventional electronic card connector;

Fig. 2 is a perspective exploded view of the present invention;

Fig. 3 is a perspective assembled view of the present

invention;

Fig. 4 is a perspective view of the grounding member of the present invention;

Fig. 5 is a perspective view of the grounding member of the present invention, seen in another direction;

Fig. 6 is a top view of the present invention;

Fig. 7 is a sectional view taken along line 7-7 of Fig. 6;

Fig. 8 is a sectional view taken along line 8-8 of Fig. 6;

Fig. 9 is a sectional view taken along line 9-9 of Fig. 6;

Fig. 10 is a sectional view taken along line 10-10 of Fig. 6;

Fig. 11 is a sectional view taken along line 11-11 of Fig. 6;

Fig. 12 is a top view of the grounding member of the present invention;

Fig. 13 is a side view of the grounding member of the present invention;

Fig. 14 is a perspective exploded view of a second embodiment of the present invention;

Fig. 15 is a perspective assembled view of the second embodiment of the present invention;

Fig. 16 is a perspective view of the grounding member of the second embodiment of the present invention;

Fig. 17 is a perspective view of the grounding member of the second embodiment of the present invention, seen in another direction;

Fig. 18 is a perspective view showing the relationship between the second embodiment of the present invention and the electronic card;

Fig. 19 is a top view of the second embodiment of the present invention;

Fig. 20 is a sectional view taken along line 20-20 of Fig. 19.

Fig. 21 is a perspective view of the grounding member of the third embodiment of the present invention; and

Fig. 22 is a perspective view of the grounding member of the fourth embodiment of the present invention.

## DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

Please refer to Figs. 2 to 13. The electronic card connector 100 of the present invention includes a plastic main body 1 having a base section 11. Two lateral arms 12 respectively extend from two sides of the base section 11. Two grounding members 2 are respectively inserted with two sides of the main body 1 for connecting with a grounding circuit of a circuit board 4. Each grounding member 2 has a U-shaped section 25 integrally connected with a board body 21 for embracing the middle of the lateral arm 12 of the main body 1 so as to reinforce the lateral arm 12.

Referring to Figs. 2 to 8, the plastic main body 1 is integrally made, including a base section 11. One side of the base section 11 is formed with a socket 111 in which the front edge of an electronic card 3 is snugly inserted. The upper and lower sides of the socket 111 are respectively formed with multiple terminal caves 112a, 112b arranged side by side. Multiple terminals 113a, 113b are respectively inlaid in the terminal caves 112a, 112b for electrically connecting with an inserted electronic card

3. Two lateral arms 12 respectively extend from two sides of the base section 11. Two insertion dents 13 are formed in the base section 11. An insertion section 22 of the grounding member 2 is snugly inserted in each insertion dent 13.

Referring to Figs. 2, 3 and 10 to 13, the grounding member 2 is made of a metal board material by integral punching. The grounding member 2 has a board body 21. The insertion section 22 forward extends from front edge of the board body 21. Ratchets 221 project from lateral sides of the insertion section 22 for tightly fitting in the insertion dent 13 of the plastic main body 1. The grounding member 2 further has a grounding conductive plate 23 downward windingly extending from one side of the board body 21 for soldering with a grounding circuit of a circuit board 4. The grounding member 2 further has a grounding resilient plate 24 rearward, upward and obliquely projecting from an edge of the board body 21. The grounding resilient plate 24 has a free end. The grounding member 2 further has a U-shaped section 25 integrally connected with the board body 21 for embracing the middle of the lateral arm 12 of the main body 1 so as to reinforce the lateral arm 12. The grounding member 2 further has a hook arm 26 integrally rearward extending from the U-shaped section 25. A rear section of the hook arm 26 is formed with a hook section 261 for hooking a hook dent 121 of rear end of the lateral arm 12. The grounding member 2 further has a locating portion 20 including a first locating section 27 downward windingly extending from one side of the hook arm 26 and a second locating section 28

also downward windingly extending from one side of the hook arm 26.

In addition, a stop shoulder 29 projects from one side of the board body 21 of the grounding member 2 for attaching to a shoulder section 14 of the main body 1.

Referring to Figs. 4, 5 and 11 to 13, each of the first and second locating sections 27, 28 of the grounding member 2 is formed with at least one reinforcing rib 271, 281. In addition, an outer face of the first locating section 27 is formed with a guide slope 272 for guiding the electronic card 3 to smoothly latch into the connector 100.

The bottom edge of inner side of the lateral arm 12 of the main body 1 is formed with a groove 122. The bottom edge 251 of the free end of the U-shaped section 25 of the grounding member 2 is snugly fitted in the groove 122, whereby the U-shaped section 25 can tightly hold two sides of the lateral arm 12.

When a user inserts an electronic card 3 into the electronic card connector 100 of the present invention, the grounding resilient plate 24 of the grounding member 2 resiliently abuts against a grounding contact 31 of the bottom of the electronic card 3. The first locating section 27 abuts against a grounding contact 32 of the top face of the electronic card 3 to prevent the electronic card 3 from upward skipping. The second locating section 28 correspondingly extends into a locating dent 33 of the electronic card 3 to stop the electronic card 3 from backing up. Accordingly, the electronic card connector 100 of the present

invention and the inserted electronic card 3 have multiple grounding contacts so that the electronic card 3 can transmit signal more stably.

Please refer to Figs. 14 to 20. The electronic card connector 100' of the present invention includes a plastic main body 1 having a base section 11. Two lateral arms 12 respectively extend from two sides of the base section 11. Two grounding members 2' are respectively inserted with two sides of the main body 1 for connecting with a grounding circuit of a circuit board 4. Each grounding member 2' has a U-shaped section 25' for embracing the front section of the lateral arm 12 of the main body 1 so as to reinforce the lateral arm 12.

In addition, a stop shoulder 29 projects from one side of the board body 21 of the grounding member 2' for attaching to a shoulder section 14 of the main body 1.

The bottom edge of inner side of the lateral arm 12 of the main body 1 is formed with a groove 122. The bottom edge 251 of the free end of the U-shaped sections 25' of the grounding member 2' is snugly fitted in the groove 122, whereby the U-shaped sections 25' can tightly hold two sides of the lateral arm 12.

Referring to Figs. 16 and 17, the two grounding members 2' are respectively inserted with two sides of the main body 1. Each grounding member 2' has a grounding resilient plate 24 and a U-shaped section 25' for embracing the front section of the lateral arm 12 of the main body 1 so as to reinforce the lateral arm 12. A resilient arm 26a extends from a first side of the

U-shaped section 25'. A hook arm 26 extends from a second side of the U-shaped section 25'. The resilient arm 26a and the hook arm together embrace two sides of the rear section of the lateral arm 12 of the plastic main body 1. In addition, a locating portion 20 is downward bent from the top edge of the hook arm 26. When an electronic card 3 is inserted into the connector 100', the front sections of the two lateral arms 12 on two sides of the main body 1 are fully embraced and reinforced by the U-shaped sections 25' of the grounding members 2'. On the other hand, the rear sections of the lateral arms 12 are not embraced by the U-shaped sections 25'. However, the resilient arms 26a resiliently abut against outer sides of the rear sections of the lateral arms. Therefore, the lateral arms 12 can be freely outward biased and the resilient arms 26a resiliently prevent the lateral arms 12 from being over-stretched and broken. Accordingly, the using life of the connector 100' is prolonged.

Referring to Figs. 14 to 20, the locating portion 20 of the grounding member 2' is an integral plate body. A first side of the locating portion 20 is formed with a first locating section 27', while a second side of the locating portion 20 is formed with a second locating section 28'. When a user inserts an electronic card 3 into the electronic card connector 100', the grounding resilient plate 24 of the grounding member 2' resiliently abuts against a grounding contact 31 of the bottom of the electronic card 3. Also, the bottom edge of the first locating section 27' on the first side of the locating portion 20 abuts against a grounding contact 32 of the top face of the electronic card 3 to together

prevent the electronic card 3 from upward skipping. The bottom section of the second locating section 28′ on the second side of the locating portion 20 correspondingly extends into a locating dent 33 of the electronic card 3 to stop the electronic card 3 from backing up. Accordingly, the electronic card connector 100′ of the present invention and the inserted electronic card 3 have multiple grounding contacts so that the electronic card 3 can transmit signal more stably. Moreover, the locating portion 20 is an integral plate body so that the inertia moment of the locating portion 20 is enhanced to effectively increase the strength thereof. Accordingly, the locating portion 20 is prevented from being deformed by external force ( such as falling test and a user's extracting the electronic card ).

The integrated locating portion 20 as shown in Figs. 14 to 20 can be used instead of the first section 27 and second locating section 28 of the first embodiment, which are split and only connected at root sections as shown in Figs. 2 to 13.

Referring to Fig. 21, the first locating section 27 and second locating section 28 respectively downward windingly extending from one side of the hook arm 26 are extended from the U-shaped section 25′ of the grounding member 2′.

Referring to Fig. 22, the first locating section 27′ and second locating section 28′ downward windingly extending from one side of the hook arm 26 are extended from the U-shaped section 25 of the grounding member 2.

According to the above arrangement, the electronic card connector 100, 100′ of the present invention has the following

advantages:

1. The weakest sections of the lateral arms 12 of the plastic main body 1 are embraced by the U-shaped sections 25 or 25' of the grounding members 2 or 2'. This avoids breakage of the lateral arms 12 and prolongs using life of the connector.

2. The grounding resilient plate 24 and the first locating section 27 of the grounding member 2 or 2' respectively tightly abut against the grounding contact 31 of the bottom of the electronic card 3 and the grounding contact 32 of the top face of the electronic card 3. Therefore, the electronic card connector 100 of the present invention contacts with the inserted electronic card 3 at many points to ensure the grounding.

3. The first and second locating sections 27, 28 or 27', 28' of the grounding member 2 or 2' not only serve to stably locate the inserted electronic card 3, but also serve as the contacts of the grounding circuit.

The above embodiments are only used to illustrate the present invention, not intended to limit the scope thereof. Many modifications of the above embodiments can be made without departing from the spirit of the present invention.